

Connecting research and public sector data through FAIR principles
Round Table
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FAIR Challenges in Transport Open Science



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Background

- **Transport research data is highly diverse** in content, structure, use, and degree of openness
- **All Transport Modes** (Road, Rail, Maritime, Air, Combined transport), **All Transport Types** (persons and goods, urban and interurban, national, European and international, operations and services)
- **Transport domains differ significantly** in the data they collect, how they refer to the data, the analyses they perform, and in their views on open data



BE OPEN project

<https://www.topos-observatory.eu/>

- Capitalize upon **existing initiatives** enabling Open Science
 - Key actors will coordinate and support actions for promoting Open Science policies, services and infrastructures
 - Involve key actors in planning and implementation
 - Enable key actors to learn from direct experience, previous knowledge and other relevant stakeholders
- Facilitate a **common understanding** among actors
 - Promoting Open Science
 - Prioritizing existing initiatives and actions at regional, European and International level
- **Monitor progress** in order to facilitate continuous improvements in Open Science exploitation
 - Proper indicators will be developed for supporting Open Science purposes
 - A monitoring process will be used to address information management, internal coordination, external coordination, risk management and other relevant dimensions



Duration: 30 months

Start Date: 01-01-2019

Call: H2020-MG-2018-SingleStage-INEA

Type of Action: Coordination and Support Action

GA Number: 824323



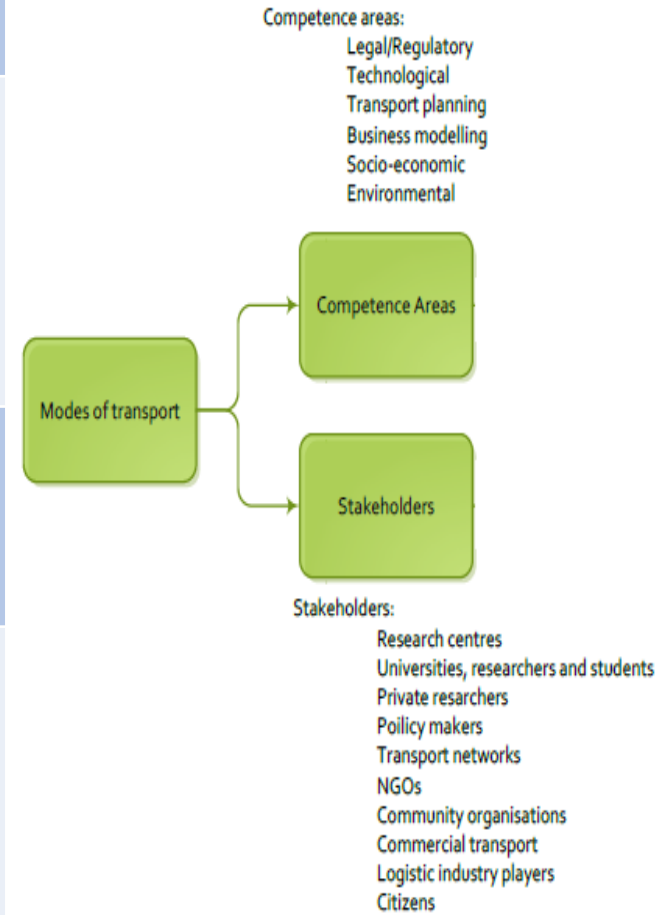
Transport Research Data

- **Original transport research data** (e.g., data from Field Operational Tests, Naturalistic Driving Studies, research results and research models)
- **Operational data** directly related to research (as accident data, transport volumes data, etc.)
- Data from **published research** (as presented in scientific journals, delivered at conferences, workshops, etc.)



Transport Key Stakeholders

Type of data	Competence Areas					
	Legal/Regulatory	Technological	Transport planning	Business modelling	Socio-economic	Environmental
Original Research Data	- Policy makers - Public authorities - Transport networks - Commercial transport and logistics industry players	- Research centres and Universities - Commercial transport and logistics industry players	- Research centres and Universities - Private researchers - Policy makers - Public authorities - Transport networks	- Policy makers - Public authorities - Transport networks - Commercial transport and logistics industry players - Citizens	- Research centres and Universities - Public authorities - Commercial transport and logistics industry players - NGOs and community organisations	- Research centres and Universities - Policy makers - Public authorities - Transport networks - Commercial transport and logistics industry players
Operational data	- Public authorities - Policy makers (international level)	Public authorities	Public authorities	Public authorities	- Public authorities - Transport networks - Commercial transport and logistics industry players	Public authorities
Data from published transport research	- Policy makers (regional and national level) - Public authorities	- Policy makers - Public authorities - Transport networks - Commercial transport and logistics industry players	- Policy makers - Public authorities - Transport networks - Commercial transport and logistics industry players	- Policy makers (international level) - Public authorities - Transport networks - Commercial transport and logistics industry players	- Policy makers (regional level) - Public authorities - Commercial transport and logistics industry players - NGOs and community organisations	- Policy makers (regional and national level) - Public authorities - Commercial transport and logistics industry players



Benefits of Data Sharing

- Open and easily accessible data will **facilitate research across communities** and countries
- Promote **more transport public-private partnerships**, with commercial companies being encouraged to make their data available
- Reduction of **funding and effort requirements** for development and operation of transport systems
- **Strengthen capabilities** and capacities/gather intelligence
- Foster **transparency** and **innovation** in the new digital transport era



Challenges in Transport Data Sharing

- **Socio-cultural**
 - diverse approaches within the transport community
 - absence of incentives and rewarding systems
- **Technological**
 - lack of awareness on communication technologies and European research e-infrastructures
- **Political**
 - different interests and needs of the various stakeholders
 - lower priority of Open Science in governmental agendas and resources allocation
- **Organizational**
 - lack of open research tools, workflows, units and services
 - lack of available human resources
- **Economic**
 - high initial investment costs on infrastructure and scientific personnel
 - long-term efficiency of research activities and resource allocation
- **Legal**
 - diversified legislation frameworks at global level
 - unclear legal environment on data privacy, ownership and security issues



Challenges, Opportunities and Barriers in Transport Research

	Challenges	Opportunities	Barriers
Researchers	<u>Technical challenges:</u> - Expertise in data security and privacy - Expertise in data management - Expertise in open licence practices - Expertise in database design and computer programming <u>Data management:</u> - Data quality - Data protection and security - Complex nature of transport data and information	<u>Openly sharing their data:</u> - More co-operations/contacts - Gain recognition - Co-authorship to other researchers' publications using their data <u>Use of open data:</u> - Accessibility to more data - More cross-disciplinary co-operations - New, original research results and products	<u>Openly sharing their data:</u> - Significant effort to produce dataset - Data protection and ethical restrictions - Concern to opening up to competitors <u>Use of open data:</u> - Insufficient documentation of the data - Not easy accessibility - Poor data quality
Research Institutions	- Legal restrictions (GDPR, privacy issues, IPR, etc.) - Contractual restrictions from other partners - Lack of skilled personnel	- Advance of the science in the transport field - Increased collaborations across institutional, national and disciplinary boundaries - Increased collaboration between companies and research infrastructures	- Data ownership/IPR - Resources and organisational issues - Competition with other institutions
Public Transport Companies/Organisations	- Data ownership conflicts - Data protection, privacy and ethical issues - Skilled personnel	- Improve transport operations and performance - Foster data-based decisions - Transparency	- Protection of commercial/confidential data - Conflicts regarding ownership/IPR - Protection of personal data
Private Transport Companies/Organisations	- Data ownership conflicts - Data protection, privacy and ethical issues - Commercial competition	- Reduce costs - Improve and align customer needs - Accessibility to more data	- Conflicts regarding ownership/IPR - Protection of commercial/confidential data - Protection of personal data - Limited financial resources

Delphi Survey on Challenges, Opportunities and Barriers in Transport Research

- **Legal and ethical issues** (GDPR, privacy issues, IPR, etc.) were assessed as the main challenges for both research institutions and transport companies
- **Lack of skilled personnel** was also highlighted as a significant challenge for research institutions and public transport companies.
- **Commercial competition** was also identified for the private transport companies.

Source: BE OPEN Project Deliverable D5.1: Main challenges, opportunities, constraints and bottlenecks of Open Science in transport research, 2020.

Requirements for Open Transport Data

- **FAIR data**: Findable, Accessible, Interoperable and Reusable
- Ensure **data quality**, i.e. relevance, accuracy, credibility, timeliness, accessibility, interpretability, coherence
- **Standards** are needed for the data collection and data formats
- High quality **metadata** describing properly the data
- Appropriate **formats** of the metadata, so that search engines easily find and characterize data
- Appropriate **infrastructure services** so that both data providers and data users easily use open data platforms
- **Data Management Plans** should be developed in all projects, based on online tools conforming to common methodologies



Conclusions

- Open Science could increase the current **great potential** of Transport Systems (new infrastructure, services, governance) with:
 - more data and knowledge
 - broader geographical coverage
- **Data sharing** will allow the verification of the scientific results, foster collaborations among researchers and promote more public-private partnership
- Further work needs to be done in setting standards and **understanding the needs of related stakeholders**
- Key policy issues are needed to be tackled, concerning the conditions in which data are provided, curated, maintained and accessed with **new and innovative business models**



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